8. Steenbock, H., and Gross, E. G.: J. Biol. Chem., 1919, xl, 501.

9. Palmer, L. S.: Ref. 1, p. 270.

10. Steenbock, H., Sell, M. T., and Buell, M. V.: J. Biol. Chem., 1921, xlvii, 89; Steenbock and Sell, J. Biol. Chem., 1922, li, 63.

11. Drummond, J. C., and Coward, K. H.: Biochem. J., 1920, xiv, 668.

12. Palmer, L. S., and Kennedy, C.: J. Biol. Chem., 1921, xlvi, 559.

13. Coward, K. H., and Drummond, J. C.: Biochem. J., 1921, xv, 530.

14. Wiehuizen, F. E., Alting, C., de Langen, C. D., and Schut, H.: Med. Genneesk Lab. Weltevreden, 1919, iii, 44, Ref. from Palmer, Ref. 1.

15. McCarrison, R.: Brit. Med. J., 1920, No. 3111, 236.

16. Underhill, F. P., and Mendel, L. B.: Amer. J. Physiol., 1928, lxxxiii, 589.

17. Crittenden, R. H., and Underhill, F. P.: Amer. J. Physiol., 1917, xliv, 13.

18. Goldberger, J., Wheeler, G. A., and Lillie, R. D.: Pub. Health Rep., 1926, xli, 300.

19. Wolbach, S. B., and Howe, P. R.: Arch. Path., 1926, i, 1.

20. Connor, C. L.: Amer. J. Path., 1928, iv, 227.

21. Hess, A. F., and Myers, V. C.: J. A. M. A., 1919, lxxiii, 1743.

22. Van den Bergh, H., Muller, P., and Brockmeyer, J.: Biochem. Ztschr., 1920, cviii, 279.

23. Connor, C. L.: J. Biol. Chem., 1928, lxxvii, 619.

24. Kaupe, et al.: Münch. Med. Woch., 1919, lxvi, 330 et seq.

25. Head, G. D., and Johnson, R. A.: Arch. Int. Med., 1921, xxviii, 268.

26. Stoner, W. C.: Amer. J. Med. Sci., 1928, clxxv, 32.

27. Baelz: Quoted from Hashimoto, H., J. A. M. A., 1922, lxxviii, 4.

28. Rabinowitch, I. M.: Canad. Med. Assn. J., 1928, xviii, 527.

## MONOCULAR OCCLUSION IN APPARENTLY ORTHOPHORIC EMMETROPES*

*By* RODERIC O'CONNOR, M. D.

*Oakland*

MY first paper on this subject appeared in the *British Journal of Ophthalmology* of 1924. It gave the results in a series of cases, and was intended to confirm and reinforce Marlow's work.

My second paper was before the 1926 meeting of the American Academy of Ophthalmology and Otolaryngology. In that paper were listed 110 patients who were apparently orthophoric but whose symptoms persisted after accurate correction of refractive errors.

In this paper I wish to list a series of emmetropes who were apparently orthophoric. All had persistent discomfort, related to the use of the eyes, severe enough to persuade them to carry out the prolonged monocular occlusion test in hopes of finding the cause of their symptoms.

In looking over my records I found at least as many similar cases who failed to carry out the test and many times the number listed who were practically emmetropic and whose muscle balance was within the degree of variation from orthophoria that is usually considered of no importance.

I am including only those who came under the strict limitations of the title in order to shorten the table and to make more emphatic the importance of the test.

In this connection I wish to state that I prove my operative results by occlusion, figuring that my work is not finished till the patient tests within the allowable variation from normal behind the patch.

This shows two things:

1. There is no need to fear the production of an opposite condition, provided, of course, that the right operation has been done at the right place.

2. The test behind the patch is the true one, exactly as the refraction under cycloplegia is the true test in that respect. In each instance the muscles involved have been put at rest.

In order to forestall the usual suggestion of a discusser I want to admit here that, if a series of *apparently normal and comfortable* eyes were patched, many would show muscle deviations, exactly as the cycloplegic discloses the true refractive error. The answer is that we are only interested in those patients who are in trouble. Because one patient may have no symptoms from a three-degree hyperphoria is no sign that another may not. In any event the occlusion test proves matters one way or the other.

The other point usually brought up in discussion is the question of accurate refraction. Ignoring the implication, I wish to state that many patients are perfectly comfortable with the hook-front prisms worn over an old correction that is known to be far from correct, and many others are comfortable with a prism correction alone when there are worthwhile amounts of ametropia present. All of which proves that moderate degrees of refractive error frequently fail to produce symptoms, just as errors of muscle balance so fail. Sometimes I see patients wearing spheres of a quarter diopter prescribed by oculists. I consider such a prescription to be an admission of ignorance of the cause of the symptoms.

Several years ago Doctor Burleson of San Antonio wrote an article praising highly an operation, devised by another Texan, for the relief of trachomatous lid troubles. He stated that, in all probability, American ophthalmologists would ignore the operation because it had not been invented by someone in central Europe with an unpronounceable name. I feel much the same in regard to the occlusion test. Had its discoverer been able to sign his name Ivan Awfulitch instead of Marlow the chances are that American ophthalmologists would have taken it up at once.

In my opinion only the unscientific and gullible type of mind can resist the proof, contained in the appended table, of Marlow's contention that

* Chairman's address, Eye, Ear, Nose and Throat Section, California Medical Association, at the Fifty-Eighth Annual Session, May 6-9, 1929.

only by prolonged monocular occlusion can an accurate diagnosis of the extraocular muscle balance be made.

1904 Franklin Street.

TABLE OF CASES

| | Heterophoria Exo. | Eso. | Hyper. | Remarks |
|---|---|---|---|---|
| 4483 | | | 1 | Headaches present as long as can remember stopped from date of patching. Prisms gave desired relief. |
| 4821 | 4 | | 2 | Prisms gave relief. |
| 5195 | | 1 | 3 | "No trouble now in using eyes." |
| 5319 | 4 | | 3 | "Entire relief from headaches." Prisms. |
| 5440 | 1 | | 3 | "Cannot get along without prisms." |
| 6155 | 3 | | 3 | "Sews constantly and no trouble." Prisms. |
| 7221 | 5 | | 6 | Optional shortening of sup. rect. gave entire relief. |
| 7398 | 7 | | 3 | Patch relieved symptoms of 15 years' standing; prisms also, but she preferred operation, which also gave relief. No return of symptoms three years later. She had had an appendectomy in hopes of relief from severe headaches. |
| 7428 | 3 | | 2 | "No troubles." Prisms. |
| 7495 | 6 | | 2 | "Can read and sew without headaches." Prisms. |
| 7804 | 8 | | 3 | "No more headaches." Prisms. |
| 4401 | 3 | | 1 | This patient could converge only to 16 inches, but refused operation for that insufficiency. |
| 238F | 6 | | 5 | "Better with prism correction." |
| 716F | 11 | | 5 | Optional shortening of sup. rect. gave entire relief except for reading. Prisms 3 in. gave relief for near. |
| 8838 | 7 | | 5 | Optional shortening of sup. rect. gave entire relief. |
| 8658 | 9 | | 6 | Shortening of sup. rect. and partial tenotomies of both externi gave complete relief from headaches. |
| 8654 | 3 | | 2 | Prisms gave relief. |
| 7797 | 8 | | 2 | Partial relief by prisms. Operation refused. |
| 7804 | 8 | | 3 | Headaches and near disability relieved by prisms. |
| 7843 | 3 | | 1 | Prisms gave entire relief even from scintillating scotoma. |
| 9560 | 3 | | 3 | Prisms gave relief. |
| 9292 | 3 | | 3 | Prisms gave relief. |
| 3306 | 9 | | 3 | Prisms gave relief. No more nausea after near use. Auto trips now possible for the first time in comfort. |
| 9728 | 6 | | 3 | Vert. prisms gave very definite relief. |

By optional operation is meant one done at patient's request with the idea of doing away with the need for any glasses. None were done unless prism correction had given relief from symptoms.

# TREATMENT OF FRACTURES*

## THE USE OF UNNA'S ZINC OXID GELATIN MIXTURE

*By* LEO ELOESSER, M.D.
AND
W. L. ROGERS, M.D.
*San Francisco*

DISCUSSION *by Maynard C. Harding, M.D., San Diego; Ralph Soto-Hall, M.D., San Francisco; H. W. Chappel, M.D., Los Angeles.*

THE adhesive mixtures generally used in applying traction for the treatment of fractures have various disadvantages. Ordinary adhesive plaster, consisting of a rubber base with zinc oxid, irritates the skin and makes a water-tight dressing. Acne pustules and blisters make it necessary to change such a dressing after five, six, or seven days. The older yellow adhesive (Maw's English adhesive plaster on moleskin) is better, but not quite so soft and pliable. A crease in the plaster makes a break in the underlying skin. It shares with rubber adhesive a tendency to slip with weights exceeding ten to twelve pounds, and when plaster slips, it invariably pulls the skin with it and makes further traction impossible. It does not keep well; old plaster is hard and brittle and does not adhere. Pure white Venice turpentine (which is not turpentine, but a solution of resins) and absolute alcohol, equal parts, painted on the skin makes an excellent adhesive mixture which gave great satisfaction abroad. It held well, so well that the cloth held by it to the skin would tear before the turpentine mixture gave; it was cheap, easily applied, and did not irritate. But it has not been possible to get the pure white Venice turpentine here; the yellow proved so irritating and made so many blisters that we had to abandon it.

Sinclair's glue and the acetone-celloidin mixture both get very hard and are likely to make pressure sores. Of the substances listed, English adhesive on moleskin for longitudinal strips, with the ordinary zinc oxid adhesive on muslin for transverse strips, seemed the most satisfactory.

### UNNA'S ZINC-GELATIN

For several years we have given up adhesive plaster for traction and have substituted Unna's zinc-gelatin and stockinette.

For use in fractures an adhesive substance should meet two requirements: it should not irritate the skin and it should stick—stick for several weeks without having to be changed and without leaving a bed of pimples and pressure sores behind. Unna's zinc-gelatin does this.

The formulas vary. A very satisfactory formula is: Zinc oxid and gelatin aa 75.0 (one part of each by weight); water and glycerin aa 150.0 (two parts of each by weight).

The gelatin should be allowed to soak in the cold water several hours before heating; the mixture is then warmed over a water bath until the gelatin is melted, the zinc oxid is stirred in, and finally the glycerin added. The quantity given above is sufficient for one dressing; it is well, however, to make up several pounds at one time. Addition of 5 to 10 cubic centimeters of 5 per cent carbolic acid will prevent mold if the mixture is to be kept. It should be dispensed in a tin container, not in a glass or porcelain jar which will crack when the mixture is heated later. It should have a rubbery consistency after it cools and be smooth and free from lumps of undissolved gelatin. Any druggist can put it up.

### OTHER ESSENTIALS FOR TRACTION

The other essentials for traction are: several yards of narrow stockinette, two or two and one-half inches wide; several yards of Canton flannel bandage two and one-half or three inches wide; a wooden board which is a little longer than the distance between the two bony prominences over which pressure may come (usually the two malleoli) and with a hole bored through its middle; some cord; carpet tacks; a hammer; and the necessary weights, pulleys, and splints.

*Read before the Industrial Medicine and Surgery Section of the California Medical Association at the Fifty-Eighth Annual Session, May 6-9, 1929.